

CLAIMS:

- 5 1. A method for reducing sludge viscosity of a sewage sludge having a solids concentration of at least 10% (w/w), comprising the steps of:
- (a) increasing the pH of the sludge to the range of 9.5-12.5;
- (b) selecting at least one step from (i) maintaining the sludge at the pH of (a) and at a temperature of 10-37°C for a period of at least one day, and (ii) adding one or more inorganic or organic chemicals to the sludge, such chemicals contributing to viscosity reduction;
- 10 (c) incubating the sludge by maintaining the resultant sludge at a temperature in the range of 40-100°C for a period of time of at least one hour;
- (d) subjecting the sludge to physical shearing or disintegration; and
- (e) subsequently discharging the sludge.
- 15 2. The method of Claim 1 in which step (b)(i) is selected.
3. The method of Claim 1 in which step (b)(ii) is selected.
4. The method of Claim 1 in which both step (b)(i) and step (b)(ii) are
- 20 selected.
5. The method of Claim 1 in which at least one of a sodium or potassium salt is added in step (b) (ii).
- 25 6. The method of Claim 1 in which steps (c) and (d) are carried out simultaneously.
7. The method of Claim 1 in which steps (c) and (d) are carried out sequentially.
- 30 8. The method of Claim 5 in which the salt is at least one of sodium or

potassium chloride.

9. The method of Claim 1 in which an oxidizing agent is added in step (b) (ii).

10. The method of Claim 9 in which the oxidizing agent is selected from the group consisting of oxygen, chlorine, perchlorate, perchlorite, hydrogen peroxide, nitric acid, sulphuric acid, potassium permanganate, sodium perborate and ozone.

11. The method of Claim 1 in which the solids concentration of >10% is obtained using a screw press, belt press or a centrifuge.

12. The method of Claim 1 in which the sludge pH is adjusted to 10.5 – 11.5.

13. The method of Claim 1 in which the pH of the sludge is adjusted to at least 12 for 2h and then to at least 11.5 for 22 h.

14. The method of Claim 1 in which the sludge is held in step (c) at a temperature and for a time sufficient to eliminate microbial pathogens.

15. The method of Claim 1 in which the pH is increased using a mono or divalent hydroxide.

16. The method of Claim 15 in which the pH is increased using lime.

17. The method of Claim 1 in which some or all of the shearing of step (d) is effected by the action of pumps.

18. The method of Claim 1 in which at least one of the treatments occurs

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25. The apparatus of Claim 24 in which the device of (a) is a screw press or belt press.

26. The apparatus of Claim 24 in which the device of (a) is a centrifuge or filtration unit.
27. The apparatus of Claim 24 in which the device of (c) comprises a rotating toothed disc or impeller.
28. The apparatus of Claim 24 in which the rotating toothed disc or impeller has a tip speed of 1000-10 000 feet/minute.

Country	Year	Population (millions)	Urban population (millions)	Urban population (%)	Population density (per sq km)	Urban population density (per sq km)	Population growth rate (%)	Urban population growth rate (%)	Population growth rate (%)	Urban population growth rate (%)	Population growth rate (%)	Urban population growth rate (%)
Algeria	1980	12.5	5.5	44	100	100	1.5	1.5	1.5	1.5	1.5	1.5
Algeria	1985	13.5	6.5	48	110	110	1.5	1.5	1.5	1.5	1.5	1.5
Algeria	1990	14.5	7.5	52	120	120	1.5	1.5	1.5	1.5	1.5	1.5
Algeria	1995	15.5	8.5	55	130	130	1.5	1.5	1.5	1.5	1.5	1.5
Algeria	2000	16.5	9.5	58	140	140	1.5	1.5	1.5	1.5	1.5	1.5
Algeria	2005	17.5	10.5	60	150	150	1.5	1.5	1.5	1.5	1.5	1.5
Algeria	2010	18.5	11.5	62	160	160	1.5	1.5	1.5	1.5	1.5	1.5
Algeria	2015	19.5	12.5	64	170	170	1.5	1.5	1.5	1.5	1.5	1.5
Algeria	2020	20.5	13.5	66	180	180	1.5	1.5	1.5	1.5	1.5	1.5
Algeria	2025	21.5	14.5	68	190	190	1.5	1.5	1.5	1.5	1.5	1.5
Algeria	2030	22.5	15.5	70	200	200	1.5	1.5	1.5	1.5	1.5	1.5
Algeria	2035	23.5	16.5	72	210	210	1.5	1.5	1.5	1.5	1.5	1.5
Algeria	2040	24.5	17.5	74	220	220	1.5	1.5	1.5	1.5	1.5	1.5
Algeria	2045	25.5	18.5	76	230	230	1.5	1.5	1.5	1.5	1.5	1.5
Algeria	2050	26.5	19.5	78	240	240	1.5	1.5	1.5	1.5	1.5	1.5
Algeria	2055	27.5	20.5	80	250	250	1.5	1.5	1.5	1.5	1.5	1.5
Algeria	2060	28.5	21.5	82	260	260	1.5	1.5	1.5	1.5	1.5	1.5
Algeria	2065	29.5	22.5	84	270	270	1.5	1.5	1.5	1.5	1.5	1.5
Algeria	2070	30.5	23.5	86	280	280	1.5	1.5	1.5	1.5	1.5	1.5
Algeria	2075	31.5	24.5	88	290	290	1.5	1.5	1.5	1.5	1.5	1.5
Algeria	2080	32.5	25.5	90	300	300	1.5	1.5	1.5	1.5	1.5	1.5
Algeria	2085	33.5	26.5	92	310	310	1.5	1.5	1.5	1.5	1.5	1.5
Algeria	2090	34.5	27.5	94	320	320	1.5	1.5	1.5	1.5	1.5	1.5
Algeria	2095	35.5	28.5	96	330	330	1.5	1.5	1.5	1.5	1.5	1.5
Algeria	2100	36.5	29.5	98	340	340	1.5	1.5	1.5	1.5	1.5	1.5
Algeria	2105	37.5	30.5	100	350	350	1.5	1.5	1.5	1.5	1.5	1.5
Algeria	2110	38.5	31.5	100	360	360	1.5	1.5	1.5	1.5	1.5	1.5
Algeria	2115	39.5	32.5	100	370	370	1.5	1.5	1.5	1.5	1.5	1.5
Algeria	2120	40.5	33.5	100	380	380	1.5	1.5	1.5	1.5	1.5	1.5
Algeria	2125	41.5	34.5	100	390	390	1.5	1.5	1.5	1.5	1.5	1.5
Algeria	2130	42.5	35.5	100	400	400	1.5	1.5	1.5	1.5	1.5	1.5
Algeria	2135	43.5										